



Atty. Docket No.: 42P17767

Patent

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Keith D. Jones

Application No: 10/750,491

Filed: December 31, 2003

For: Improved materials For Electronic  
Devices

Examiner: Sheila V. Clark

Art Unit: 2823

Confirmation No.: 1802

Mail Stop: Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

**INFORMATION DISCLOSURE STATEMENT**

Sir:

Enclosed is a copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 together with copies of the documents cited on that form, except for copies not required to be submitted (e.g., copies of U.S. patents and U.S. published patent applications need not be enclosed). It is respectfully requested that the cited documents be considered and that the enclosed copy of Information Disclosure Citation Form PTO-1449 or PTO/SB/08 be initialed by the Examiner to indicate such consideration and a copy thereof returned to applicant(s).

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on June 28, 2004.

(Date of Deposit)

Carla Vignola

(Typed or printed name of person mailing correspondence)

(Signature of person mailing correspondence)

**Applicant would like to bring the following to the Examiner's attention:**

**Advanced substrates for electronic packaging used build up layers to allow the routing densities necessary for high I/O and power devices. These build up layers typically have CTE values substantially higher than that of the Cu traces and of the X-Y plane CTE of their core materials. This CTE mismatch leads to high stresses in these BU layers, leading to failures such as delamination, corner via cracking, et al.**

**Most BU materials consists of a photo-sensitive dielectric such as epoxy filled with Silica particles. The volume fraction of Silica particles will determine the effective CTE of the binder, with a higher volume fraction causing a lower CTE. This lower CTE is balanced, however, by the increase in viscosity of the binder, with recent attempts to lower the effective CTE of the BU materials has consisted of using different types of binder materials or modifiers, including polyolefins and rubber particulates. Other filler materials such as aramid short fibers have been uses as well.**

**A build up layer is known in the art of electronic packaging to allow routing densities necessary for high I/O, by isolating layers of conductive material disposed on a core of a substrate, to effect space transformation from the semiconductor die (relatively small, contact, and dense) through a substrate (a relatively larger grid) to a system contact (BGA, LGA, etc).**

Pursuant to 37 C.F.R. § 1.97, the submission of this Information Disclosure Statement is not to be construed as a representation that a search has been made and is not to be construed as an admission that the information cited in this statement is material to patentability.

Pursuant to 37 C.F.R. § 1.97, this Information Disclosure Statement is being submitted under one of the following (as indicated by an "X" to the left of the appropriate paragraph):

       37 C.F.R. §1.97(b).

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       A statement pursuant to 37 C.F.R. §1.97(e) or

  X   A check for \$180.00 for the fee under 37 C.F.R. § 1.17(p).

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- (1) A statement pursuant to 37 C.F.R. §1.97(e); and
- (2) A check for \$180.00 for the fee under 37 C.F.R. §1.17(p) for submission of the Information Disclosure Statement.

If there are any additional charges, please charge Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: Jun 28, 2006



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### Summary of USPTO Kind Codes Used on Documents Published Beginning January 2, 2001

WIPO ST.16 Kind Codes	Kind of document	Comments
A1	Patent Application Publication	Pre-grant publication available March 2001
A2	Patent Application Publication (Republication)	Pre-grant publication available March 2001
A9	Patent Application Publication (Corrected Publication)	Pre-grant publication available March 2001
B1	Patent	No previously published pre-grant publication
B2	Patent	Having a previously published pre-grant publication and available March 2001
C1, C2, C3...	Reexamination Certificate	Previously used codes B1 and B2 are now used for granted Patents
E	Reissue Patent	No change
H	Statutory Invention Registration (SIR)	No change
P1	Plant Patent Application Publication	Pre-grant publication available March 2001
P2	Plant Patent	No previously published pre-grant publication
P3	Plant Patent	Having a previously published pre-grant publication and available March 2001
P4	Plant Patent Application Publication (Republication)	Pre-grant publication available after March 2001
P9	Plant Patent Application Publication (Corrected Publication)	Pre-grant publication available March 2001
S	Design Patent	No change

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

U.S. PATENT & TRADEMARK OFFICE  
JUL 03 2006

Application Number	10/750,491
Filing Date	12-31-2003
First Named Inventor:	Keith D. Jones
Art Unit	2823
Examiner Name	Clark, Sheila V.

U.S. PATENT DOCUMENTS

[illegible]

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup> Number <sup>4</sup> Kind Code <sup>5</sup> (if known)				

Examiner Signature		Date Considered	
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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS.

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Based on Form PTO/SB/08A (08-03) as modified by BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP on 09/10/03.

<b>Substitute for Form 1449/PTO</b>  <b>INFORMATION DISCLOSURE</b> <b>STATEMENT BY APPLICANT</b> <i>(use as many sheets as necessary)</i>				<b>Complete if Known</b>	
				Application Number	10/750,491
				Filing Date	12-31-2003
				First Named Inventor:	Keith D. Jones
				Art Unit	2823
				Examiner Name	Clark, Sheila V.
Sheet	2	of	2	Attorney Docket Number	42P17767
<b>NON PATENT LITERATURE DOCUMENTS</b>					
Examiner Initials*	Cite No <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published			T <sup>2</sup>
		Discussion within the present Information Disclosure Statement.			
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		EVANS, J.S.O., et al. "Negative thermal expansion materials", pp. 1 Abstract, www.ei.org/ (2001).			
		CHANG, W., Technical Literature, "Zirconium Tungstate" pp. 17, printed on December 10, 2001.			
		PEROTTONI, et al., "Pressure-induced amorphization and negative thermal expansion in Zr <sub>2</sub> W <sub>2</sub> O <sub>8</sub> " Science, May 8, 1998, v280 n5365 p886(4), pp. 4, http://web2.insite2.gale.com/			
		ANONYMOUS, "Zirconium Tungstate Behavior Explained" High Tech Ceramics News, April 1, 1997 v8 i12 pN/A, pp. 2.			
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		EVANS, et al., "Compressibility, phase transitions, and oxygen migration in zirconium tungstate, ZrW <sub>2</sub> O <sub>8</sub> " Science, January 3, 1997, v275 n5296 p61 (5), pp.6.			
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		MARY, et al., "Negative thermal expansion from 0.3 to 1050 Kelvin in ZrW <sub>2</sub> O <sub>8</sub> " Science, April 5, 1996, v272 n5258 p90(3), pp. 5			

Examiner Signature		Date Considered	
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\*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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